

an optical fiber coupled at a first end to an end of said fiber; and

means for coupling both said signals and said light for pumping into said optical fiber.

A2  
Contd 19. A fiber optic amplifier system as defined in Claim 18 in which said means for coupling comprises an optical coupler.

20. A fiber optic amplifier system as defined in Claim 19, wherein said optical coupler comprises a single mode optical coupler.

21. A fiber optic amplifier system as defined in Claim 19 in which said optical coupler utilizes evanescent field coupling.

22. A fiber optic amplifier system as defined in Claim 19 in which said optical coupler provides different coupling coefficients for said signals and said light for pumping.

23. A fiber optic amplifier system as defined in Claim 22 in which said optical coupler has a coupling efficiency which is wavelength dependent and in which said signals and said light for pumping are at different wavelengths, yielding different coupling efficiencies for said signals and said light for pumping.

24. A fiber optic amplifier, comprising:

a fiber optic coupler including a pair of optical fibers juxtaposed to provide coupling of light at a first frequency between said fibers and to prohibit coupling of light at a second frequency between said fibers;

a source of pumping illumination coupled to a first end of one of said pair of fibers, said pumping illumination being at said first frequency;

a2  
Contd

a source of a signal to be amplified, coupled to a first end of the other of said pair of fibers, said signal to be amplified being at said second frequency; and

a laser fiber formed of material which will possess a laser transition at the frequency of said signal to be amplified if said material is pumped with said pumping illumination, said laser fiber coupled at one end to a second end of said other of said pair of fibers.

25. A fiber optic amplifier system as defined in Claim 24 in which said fiber optic coupler has an effective interaction length at the juxtaposition of said optical fibers which is an even multiple of the coupling length of said fibers at said juxtaposition at the wavelength of one of said signals to be amplified and said pumping illumination and an odd multiple of the coupling length of said fibers at said juxtaposition at the wavelength of the other of said pumping illumination and said signals to be amplified.

26. A fiber optic amplifier system as defined in Claim 25, wherein said pair of optical fibers are laterally offset from one another to tune said coupler to the wavelength of said signals to be amplified and said pumping illumination.

27. A fiber optic amplifier system as defined in Claim 26, wherein said pair of optical fibers are arcuate and wherein the radius of said arcuate optical fibers is selected in accordance with the wavelength difference between said pumping illumination and said signals to be amplified.

28. A method of amplifying a light signal carried by an optical fiber, comprising:

combining said light signal and pumping illumination on a single optical fiber; and

coupling said combined light signal and pumping illumination from said single optical fiber to one end of a fiber comprised of a material which will emit stimulated radiation at the frequency of said light signal if pumped with said pumping illumination.

29. A method of amplifying a light signal as defined in Claim 28, wherein said combining step comprises multiplexing of said light signal and said pumping illumination in an optical coupler which is optically connected to said single optical fiber and which has a coupling efficiency which is wavelength dependent.

14  
13A 30. A method of amplifying a light signal as defined in Claim 29, wherein said multiplexing step comprises:

juxtaposing a pair of optical fibers to provide an interaction length; and

applying said light signal to one of said fibers and said pumping illumination to the other of said fibers.

Subt. B2  
31. A method of amplifying a light signal as defined in Claim 28, wherein the step of coupling comprises coupling said combined light signal and pumping illumination to a laser fiber having a diameter which is less than the absorption length of said crystal fiber at the wavelength of said pumping illumination.